

Rebhu Computing

Semiconductor for Vision AI

Disclaimer

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Meet our Team



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Ajad Singh

Embedded Engineer



Prabhat Srivastava

Software Engineer



Vibhanshu Verma

Embedded Software



Partners – Industry and Academia



Clients and End-users



About Us

Rebhu Computing delivers **vision-based intelligence to automotive, robotics, and drone** manufacturers. The organisation is delivering autonomy in operations of terrestrial and aerial vehicles.

We have three key verticals. First is for Computer Vision and Software, second is for Embedded Systems Design, and finally development of IP Cores. All these three units play a vital strategic role for enabling our vision of developing Semiconductor for AI in Edge.



Mission and Vision



Our mission is to enable driverless and pilot-free operations of automotive and aerospace vehicles



Vision

Rebhu Computing is building vision centre of the brain for things. We call it **the**

Occipital Lobe for Things



Awards and Recognitions

Rebhu Computing has been recognised for its efforts in defence



Core Competency



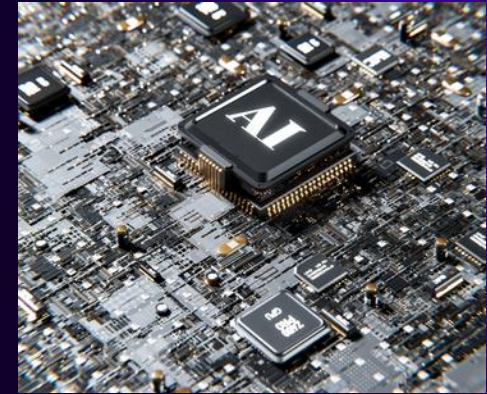
Computer Vision

We provide the most number of vision applications in classical as well as learning approaches. Our team is building a large vision model for all purposes



Embedded Systems

We provide embedded system design services including high-speed and high-frequency circuits and miniaturization including VLSI for PiP, SiP, etc.

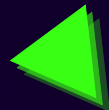


IP Cores

Matrix Multiply Accelerators, Gaussian Accelerators, and Image Morphological Enhancers are three key IP Cores developed for AMD Xilinx Kintex.

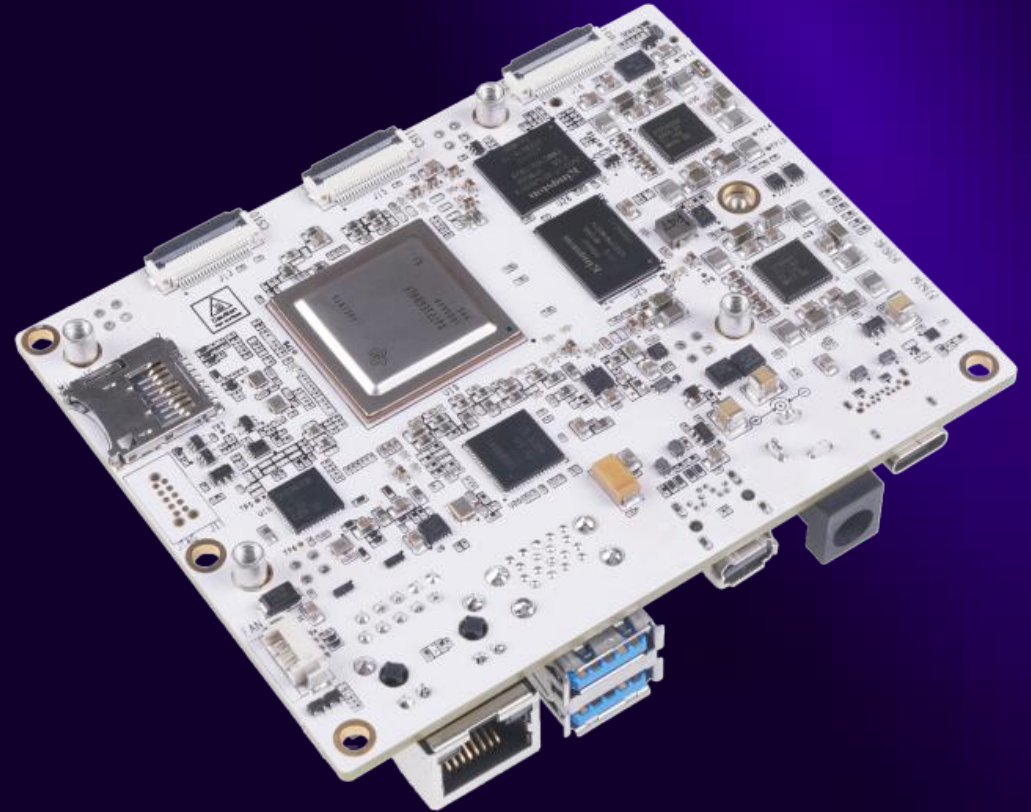


Products



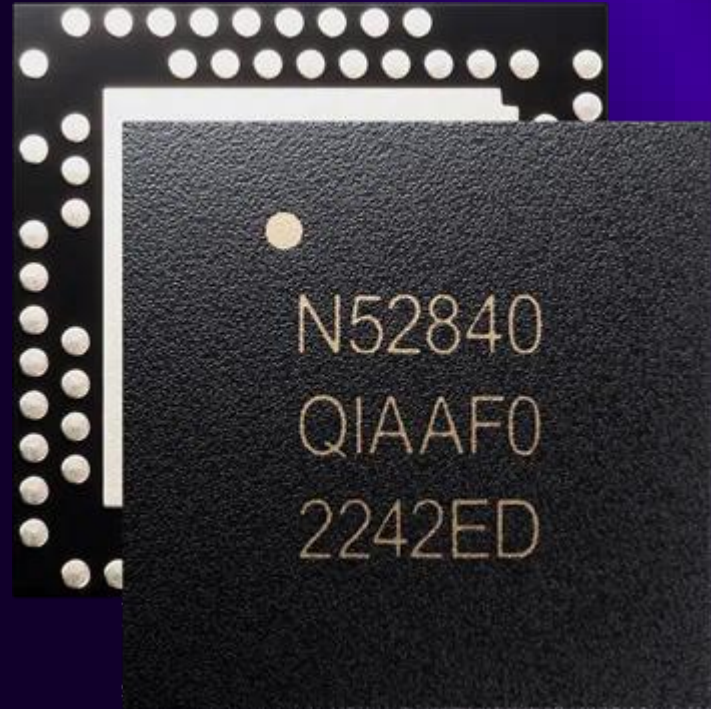
AutonomySi

This is an Edge AI board with applications in automotive, robotics, and drones. It features TDA4VM by Texas Instrument which is ASIL-D certified processor, making it suitable for onboard processing use cases. This microprocessor has multiple hardware accelerated cores that reduce the time to infer from data.



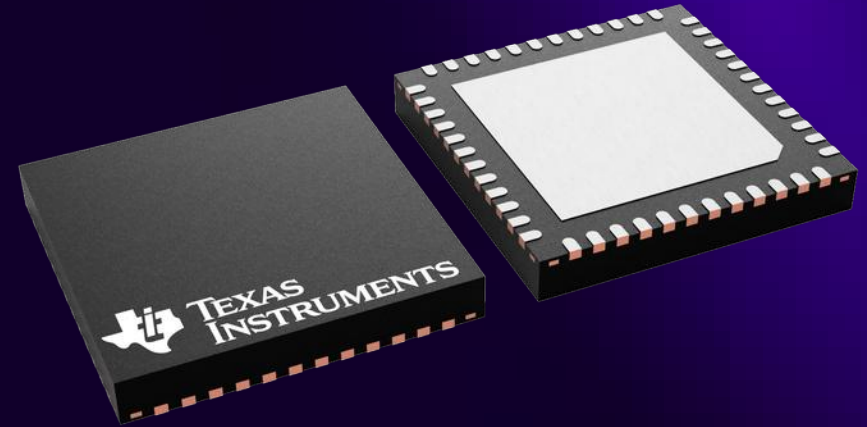
LocalNetSi

This board is developed on top of nRF52840 by Nordic Semiconductors. It provides centimeter level accuracy with direction-finding in local positioning systems. It can be used to identify and track assets in a indoor environments. It is used for asset tracking in indoor environments.



ConduitSi

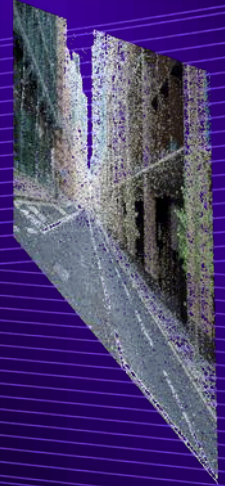
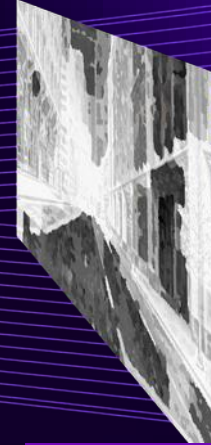
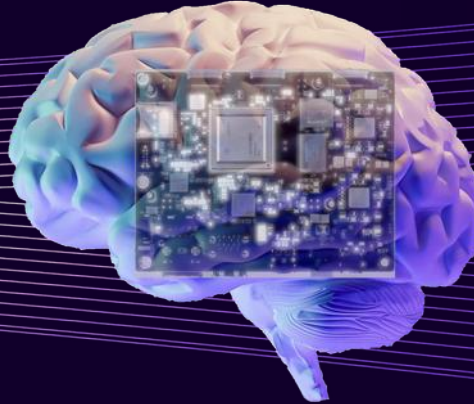
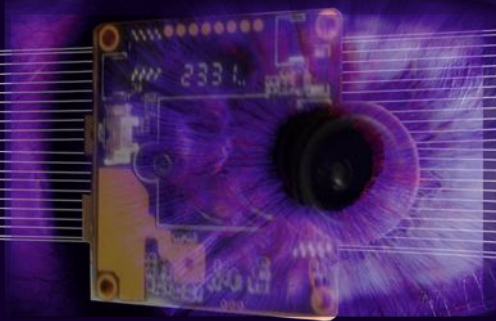
A Software-defined Radio chip that supports multiple bands. This board features Texas Instruments Simplelink™ CC1352P7 wireless MCU. It can be programmed for Sub-GHz, and 2.4GHz operations. Proprietary protocols can be built on this board.



Solutions



Visual Navigation



Camera & Sensing

Selection of economic cameras that meet the requirements these include monocular, stereo-vision cameras, GPS, IMUs, etc.

IP Cores and Hardware

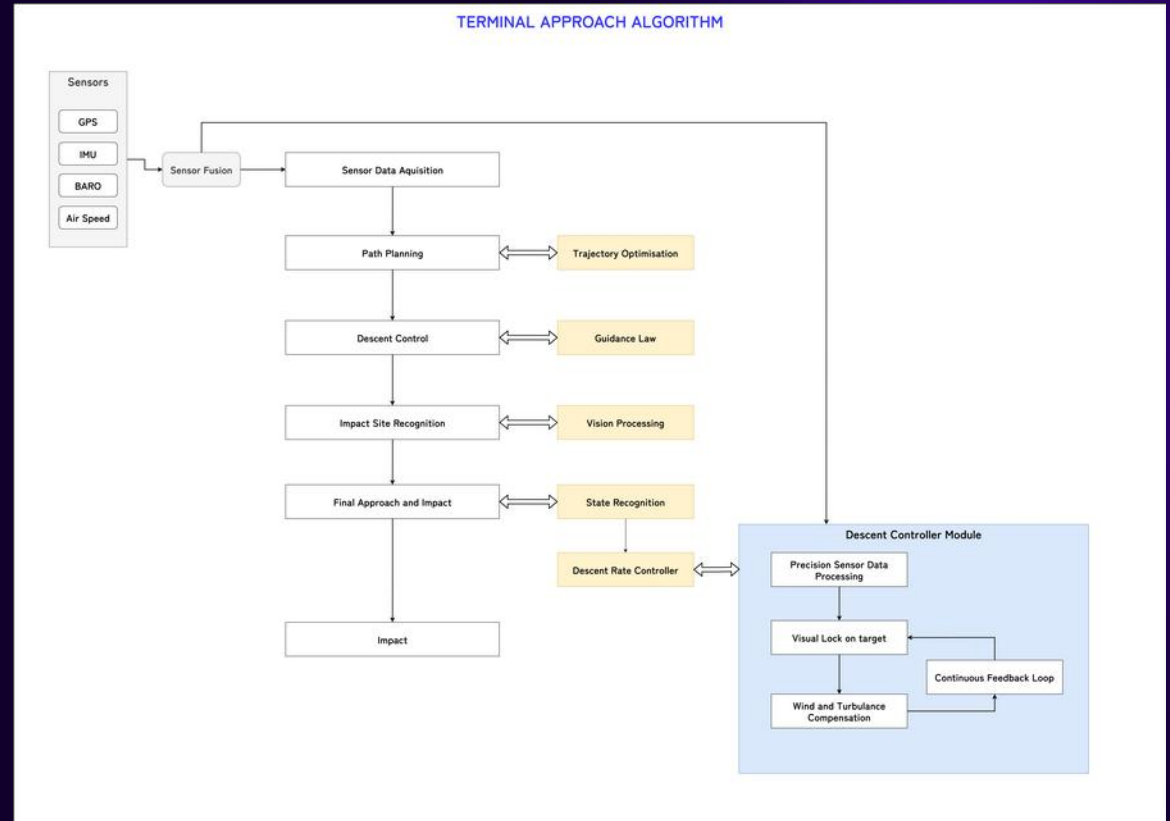
Our IP Cores, under development, and embedded systems are designed and procured specifically for hyper real time applications

Vision and Control

The vision and control software stack is responsible for inferencing the camera & sensing data for vehicle's motion

Drone Kamikaze Software

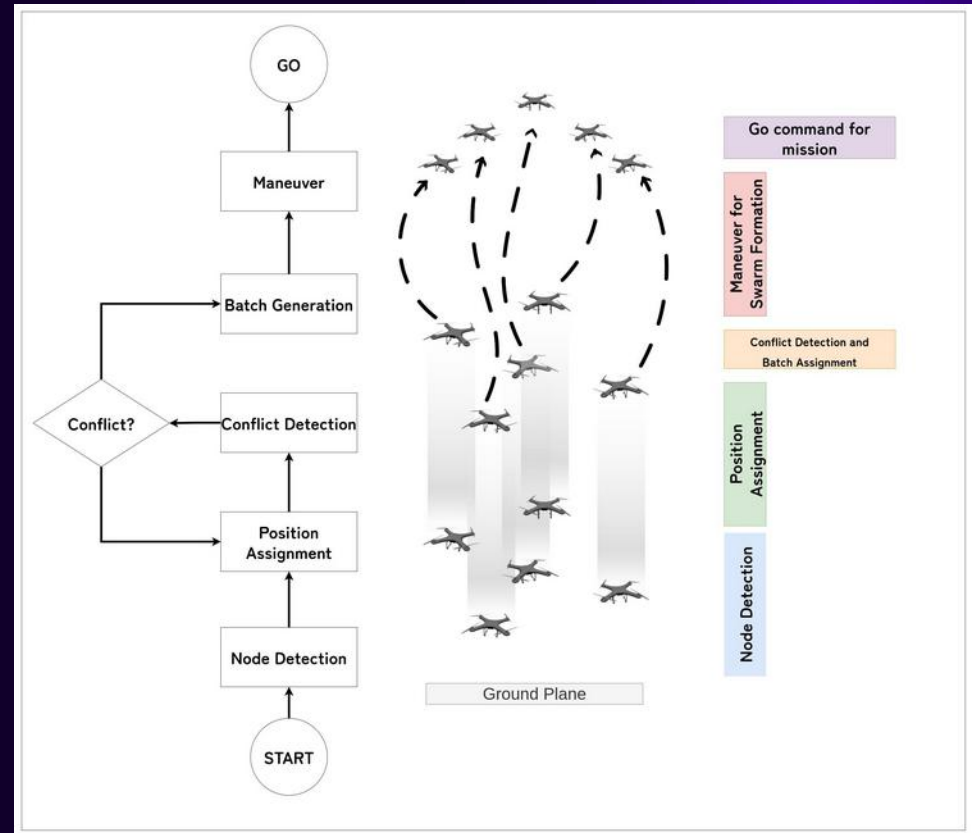
The kamikaze algorithm is developed indigenously. It includes a proprietary 'Guidance Law'. The system supports stationary and mobile targets on ground, in air, or at sea.



Drone Swarm Software

The swarming algorithm is developed indigenously. It supports following configurations:

		Class of Drones	
		Homogeneous	Heterogeneous
Mission Type	Same	TRUE	TRUE
	Different	TRUE	TRUE



Drone Intelligence

Detection, Recognition,
and Identification

Tracking with
optional Following

Estimate Target Geolocation

Precision Landing using
Vision, or Direction Finding

GPS-denied and GPS-
spoofing prevention

Kill Switch



Drone Intelligence

Intelligent Battery
Management System

Intelligent Failsafe Rescue

GCS for Complex Missions

Autonomous Room
Intervention

Collaborative Missions

Image Enhancement in EO
and IR



Image Processing

Visible Image Enhancement

Approaches: Histogram Equalization, Retinex, Deep Learning

Visible-IR Image Fusion

Approaches: Detail Enhancement Guided Image Filtering

Background Subtraction

Approaches: Single Gaussian Model, LOTS

Target Tracking

Infrared Search and Track

Approaches: Pixel Level Local Contrast Measure

Robust Tracking

Approaches: Correlation Filter, Particle Filter

Extended Tracking

Approaches: Gaussian Process Model for Star-Convex Shape

Sub-pixel Tracking

Approaches: Shape-based Object Recognition with Model Update

Other Features

Adaptive Target Enhancement, CAN Interface, Panoramic Feature Insertion for Visible Images, etc.

IP Cores for Image Processing

Gaussian Accelerator

Dedicated solver for hardware accelerated Gaussian solver

Matrix Multiply Accelerator

Accelerate deep learning inferences using dedicated IP

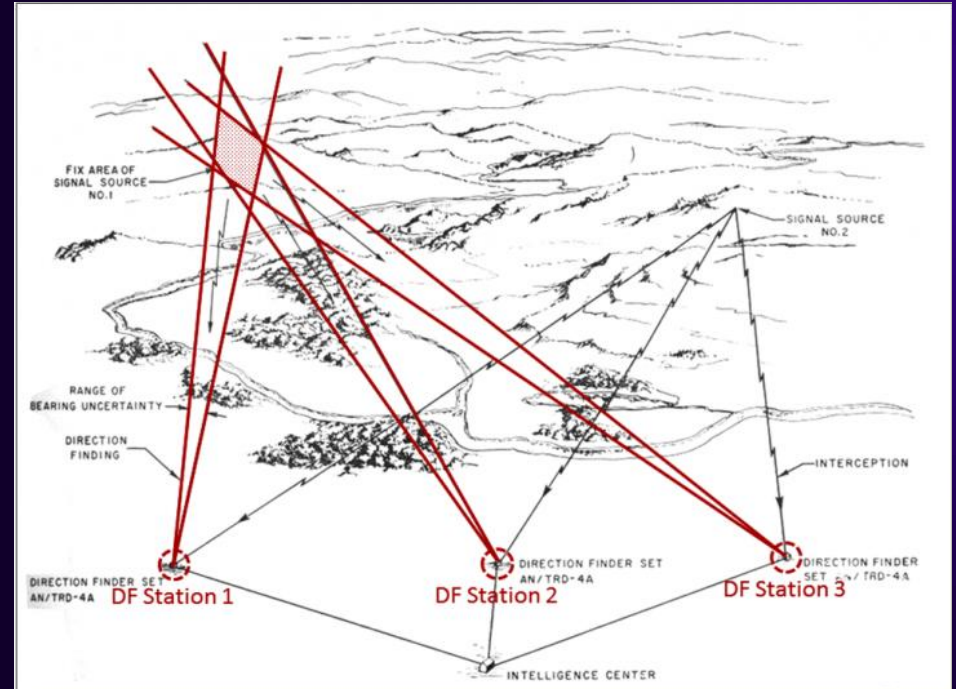
Morphological Enhancers

Hardware accelerated erosion and dilation for low-latency processing



Asset Tracking

The asset tracking solution is built on top of LocalNetSi and ConduitSi. All these components enable tracking assets in outdoor as well as indoor environments. Multiple units of these hardware are installed at key location that triangulate the asset location.



Autonomous ATGM Control



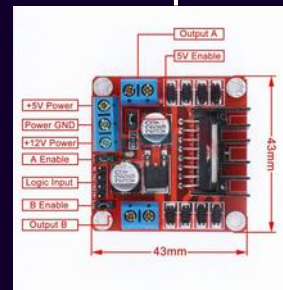
Laptop for Operator with Radio transceiver



AutonomySi Lite



Motors



Motor Controller



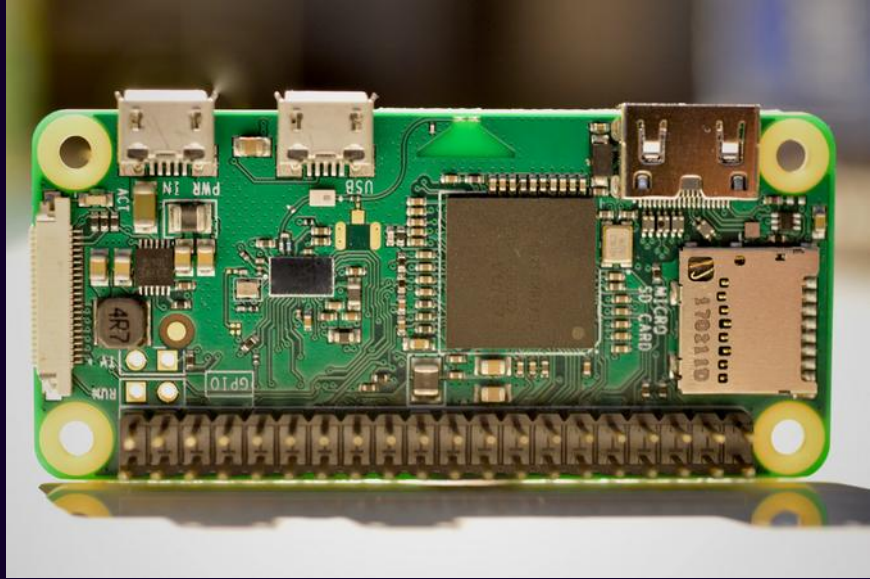
This system can be extended to CQB weapons and other systems

Services



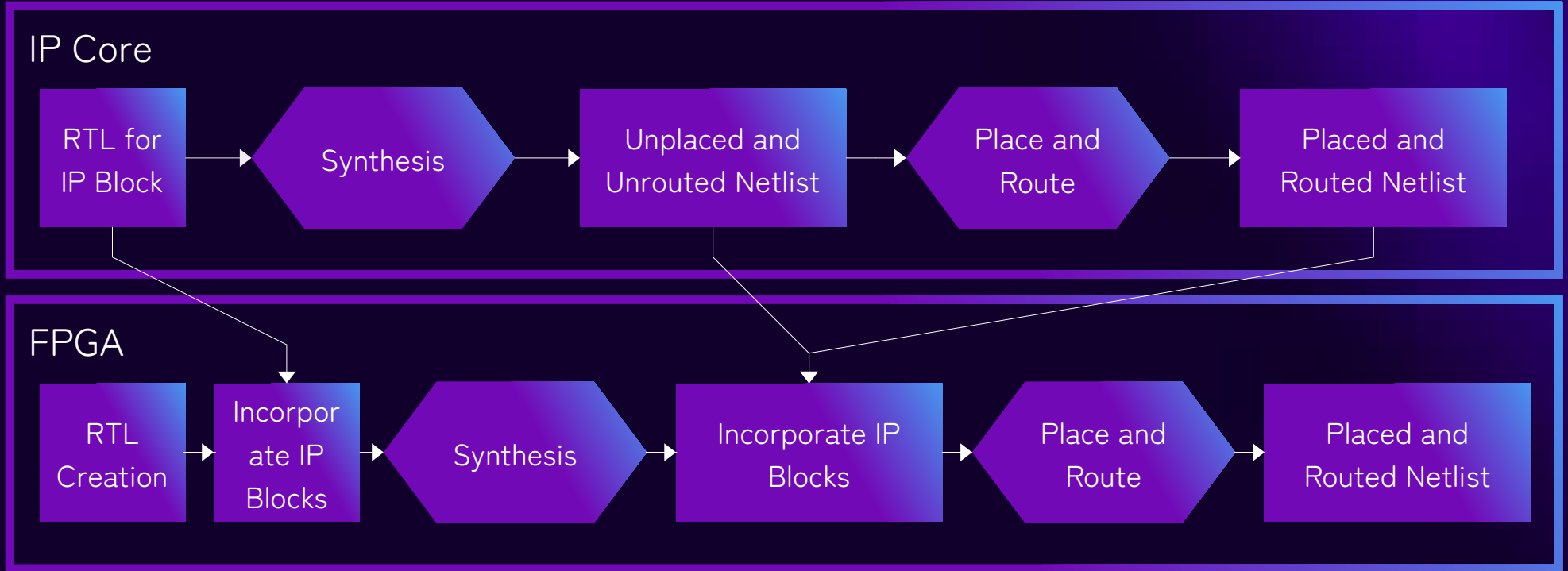
ESDM Services

We provide design, development, testing, and manufacturing of the custom PCB which includes high-speed and high-frequency domains. Our capabilities include designing boards with 12 layers. The processes for development are backed by best-practices in EDA, CAD, and CAE. We also perform extensive EMI/EMC testing before manufacturing the PCB.



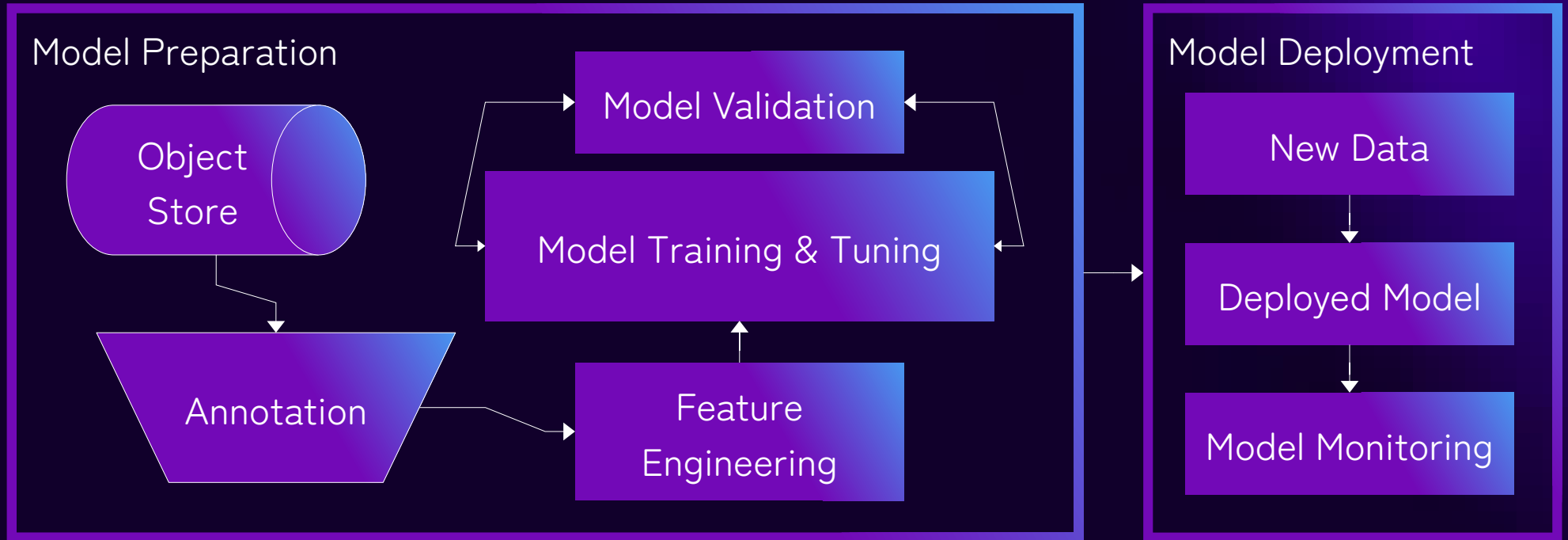
IP Core Services

Turnkey services to develop IP Cores on FPGA



Custom AI Model Development

Turnkey services to develop custom AI model on-premise



Edge AI

Comprehensive solution for AI model deployment in Edge

Hardware Software
Co-design

Knowledge Distillation

Quantization

Model Pruning and Sparsity

Hyper-parameter Tuning

Data Preprocessing and
Sanitization



Join us on our journey

to build

Semiconductors for AI

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